

Collision integral for charged ...

S/056/62/042/CC3/041/049
B108/B102

longitudinal and transverse momenta as well as on the y components of the Larmor radii. There are 8 references: 6 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: N. Rostoker. Phys. of Fluids, 3, 922, 1960; Higher Transcendental Functions, 2, N.-Y., 1953, p. 199.

ASSOCIATION: Institut fiziki metallov Akademii nauk SSSR (Institute of Physics of Metals of the Academy of Sciences USSR)

SUBMITTED: October 30, 1961

Card 3/3

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S/053/62/076/001/002/004
B117/B101

24.2/20
AUTHORS: Rukhadze, A. A., and Silin, V. P.

TITLE: Linear electromagnetic phenomena in plasma

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 1, 1962, 79 - 108

TEXT: This is a summary of the progress achieved in the field of linear electromagnetic processes in plasma which, according to the authors, will form the foundation of nonlinear electrodynamics of plasma. Electromagnetic properties of plasma as to the type of distribution function of particles with respect to their velocities are dealt with on very general assumptions, special attention being paid to the electromagnetic phenomena in nonequilibrium plasma. The problems dealt with comprise: Tensor of the dielectric constant of plasma; electromagnetic properties of isotropic plasma; anisotropic plasma without strong fields; electromagnetic waves in plasma placed in a strong magnetic field; interaction of a beam of charged particles with magnetically active plasma; particle collisions in plasma; fluctuations of the electromagnetic field in plasma. B. A. Trubnikov, V. S. Kudryavtsev, Yu. N. Dnestrovskiy, D. P. Kostomarov, Ya. B. Faynberg,
Card 1/2

S/020/62/145/004/010/024
B178/3102

26-1021
AUTHORS: Klimontovich, Yu. L., and Silin, V. P.

TITLE: Fluctuations in collision-free plasma

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 4, 1962, 764-767.

TEXT: A fluctuation theory of the distribution functions in a collision-free plasma is developed in continuation of the papers by Yu. L. Klimontovich (ZhETF, 37, 735, 1959; 38, 1212, 1960; 33, 982, 1957; 34, 173, 1958;), allowing not only for the Coulomb interaction of the particles but also for a transverse electric field. The space-time spectral functions are obtained without previously determining the correlation functions. Thus the problem can be simplified. Formulas for the fluctuations δE and δN in the spatially isotropic case are calculated. For the special case of isotropic momentum distribution in the constant magnetic field a formula is derived for the collision integral. For the Maxwellian distribution of the particles at equal temperatures a simple expression is obtained for the Debye screening.

Card 1/2

Fluctuations in collision-free plasma

S/020/62/145/004/010/024
B178/B102

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: February 17, 1962, by M. A. Leontovich, Academician

SUBMITTED: October 24, 1961

B

ser. 2/2

L0386
S/020/62/145/006/009/015
B183/B102

24.2120
AUTHORS:

Silin, V. P., and Gorbunov, L. M.

TITLE:

Kinetics of a non-isothermal plasma

PERIODICAL:

Akademiya nauk SSSR. Doklady, v. 145, no. 6, 1962, 1265-1268

TEXT: The influence on the transfer coefficients of a non-isothermal plasma due to electrons and ions interacting with the plasma waves is considered. Slightly damped sonic waves of $T_e \gg T_i$ can exist in a non-isothermal plasma, and their effect on the kinetic coefficients of the plasma can be calculated. In this case it is sufficient to take the polarization coefficient into account when calculating the collisions of the electrons among themselves. Only when $T_e/T_i > 10^4$ does it become necessary to include the polarization effects in calculating the electron-ion and ion-ion collisions. The complicated electron-electron collision integral which takes account of polarization is obtained by expanding the distribution function. The following expressions are got by solving the set of equations for the coefficients of the Sonin-Laguerre series used:

Card 1/3

Kinetics of a non-isothermal ...

S/020/62/145/006/009/015
B183/B102

$$j = \frac{eN_e x T_e}{m_e} \left\{ \frac{1}{v_{\bullet\bullet}} \left[\frac{eE}{xT_e} - \frac{\partial \ln N_e T_e}{\partial r} \right] - 5.1 \frac{1}{T_e} \frac{\partial \ln T_e}{\partial r} \right\} \quad (17)$$

for the current density,

$$q = \frac{N_e (xT_e)^{3/2}}{m_e / v_0} \left\{ 5.1 \left[\frac{eE}{xT_e} - \frac{\partial \ln N_e T_e}{\partial r} \right] - 21.2 \frac{\partial \ln T_e}{\partial r} \right\} \quad (18)$$

for the heat flux and

$$\eta = 1.81 \frac{xT_e}{v_0 I} N_e \quad (23)$$

for the viscosity, where

$$v_{\bullet\bullet} = \frac{4}{3} \frac{e^2 e_f^2 N_e \sqrt{2\pi}}{(xT_e)^{3/2} \sqrt{m_e}} \ln(k_{\max}^{\prime} r_D) \quad (19),$$

$$v_0 = \frac{4}{3} \frac{N_e e^4 \sqrt{2\pi}}{(xT_e)^{3/2} \sqrt{m_e}} \quad (7) \text{ and}$$

Card 2/3

KLIMONTOVICH, Yu.L.; SILIN, V.P.

Fluctuations in a plasma without collisions. Dokl. AN SSSR 145
no.4:764-767 Ag '62. (MIRA 15:7)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
Predstavleno akademikom M.A.Leontovichem.
(Plasma (Ionized gases))

BELEN'KIY, S.Z. [deceased]; VUL, B.M.; ZHARKOV, G.F.; ZHDANOV, G.B.;
SILIN, V.P.; FAYNBERG, V.Ya.; FEYNBERG, Ye.L.; LARIN, S.I.,
red.; UL'YANOVA, O.G., tekhn. red.

[From classical to quantum physics; fundamental representations in the theory of the constitution of matter] Ot klassicheskoi fiziki k kvantovoi; osnovnye predstavleniia ucheniia o stroenii materii. Moskva, Izd-vo Akad. nauk SSSR, 1962. 69 p.
(MIRA 16:3)

(Physics) (Quantum theory) (Matter--Constitution)

RAMAZASHVILI, R.R.; RUKHADZE, A.A.; SILIN, V.P.

Rate of temperature equalization of charged particles in
a plasma. Zhur. eksp. i teor. fiz. 43 no.4:1323-1330
0 '62. (MIRA 15:11)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.
(Plasma (Ionized gases))

SILIN, V.P.

Relaxation of electron and ion temperatures of a totally
ionized plasma in a high magnetic field. Zhur. eksp.
i teor. fiz. 43 no.5:1813-1820 N '62. (MIRA 15:12)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.
(Plasma (Ionized gases))
(Magnetic fields)

L 15610-63 EWT(1)/EWG(k)/BDS/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/SSD
Ps-4/P1-4/Po-4/Pab-4 AT/IJP(C) S/0141/63/006/003/0640/0641
ACCESSION NR: AP3004895

AUTHOR: Silin, V. P.

TITLE: Slightly attenuating oscillations in inhomogeneous plasma

SOURCE: IVUZ. Radiofizika, v. 6, no. 3, 1963, 640-641

TOPIC TAGS: plasma, inhomogeneous plasma, plasma oscillation

ABSTRACT: Mathematical results are presented of a theory of slightly attenuating natural oscillations in an inhomogeneous plasma for the case when the characteristic dimension of inhomogeneity is large as compared with the "wavelength"; geometrical optics approximation is used. A most simple case is considered of a one-dimensional inhomogeneity (along x-axis) and of waves propagating in the direction of the inhomogeneity. H-f Langmuir waves of a Maxwellian plasma, neglecting absorption, are described with this second-order equation whose spectrum is determined by a quasi-classical quantization rule:

Card 1/2/

SILIN, V.P.

Collision integral for a plasma. Izv. vys. ucheb. zav.; radiofiz.
6 no.4:702-708 '63. (MIRA 16:12)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

ACCESSION NR: AP4004701

S/0126/63/016/005/0798/0799

AUTHORS: Zy*ryanov, P. S.; Silin, V. P.

TITLE: Quantum theory of transfer phenomena in an electron gas under the influence of a magnetic field

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 5, 1963, 798-799

TOPIC TAGS: electron gas, transfer phenomenon, quantum theory, magnetic field transfer, magnetic field, phenomenon, nonhomogeneous space, space temperature, Fermi gas, quantizing magnetic field, spatial inhomogeneity, Fermi energy

ABSTRACT: The transport phenomena in an electron gas with weak nonhomogeneity in temperature T and chemical potential ζ , under homogeneous magnetic and electric fields, are studied. Expressions for the current flow and heat flow vectors are derived in terms of a linear combination of electric field gradient, chemical potential gradient, and temperature gradient relative to the x -coordinate. The gas is assumed collisionless. It is found that the electric field gradient and chemical potential gradient oppose each other in both the current flow and heat flow expressions. Orig. art. has: 8 equations.

Card 1/2

SILIN, V. P.

AID Nr. 976-6 24 May

OSCILLATIONS OF A WEAKLY INHOMOGENEOUS PLASMA (USSR)

Silin, V. P. Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 4,
Apr 1963, 1271-1282. S/056/63/044/004/022/044

Natural high-frequency electron oscillations of a weakly inhomogeneous plasma have been investigated and their proper expressions found by employing dispersion equations in geometric optics. These equations are analogous to the quasi-classical Bohr quantization rules, which were also used in investigating low-frequency oscillations in a flat plasma layer and in a cylindrical plasma column, both confined by a magnetic field. The investigation was restricted to one-dimensional quantization rules and to a nonabsorbing or weakly absorbing medium.

[JA]

Card 1/1

L 13634-63 EWT(1)/EWG(k)/BDS/EEC(b)-2/ES(t)-2/ES(w)-2 ASD/ESD-3/
~~AFWL/AFFTC/SSD~~ ~~P1-4/Po-4/Pab-4/Pz-4~~ ~~AT/IJP(C)~~
 ACCESSION NR: AP3003126 S/0056/63/044/006/1953/1963

AUTHOR: Kovrizhny*kh, L. M.; Rukhadze, A. A.; Silin, V. P.

TITLE: Oscillations of a low pressure inhomogeneous plasma

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1953-1963

TOPIC TAGS: plasma oscillations, low pressure, optical approximation, strong magnetic field containment

ABSTRACT: The methods of geometric optics are extended to electrodynamics with spatial dispersion, when the field equations are integral equations, and applied to the problem of stability of a magnetically confined plasma. The dispersion relations for longitudinal oscillations are derived. Analysis of the dispersion relations for the limiting cases of long and short wave perturbations yields the necessary and sufficient conditions for plasma instability. It is shown, in particular, that if the ratio of the electron to ion temperatures is independent of the coordinates, a weakly inhomogeneous low-pressure plasma confined by a magnetic field is almost always unstable against short-wave oscillations. It is pointed out that the instabilities of an inhomogeneous plasma confined by a strong field are kinetic, since they are associated with residue terms in the kernel of the solved integral equation. Orig. art. has: 38 formulas.

Association: Physics Inst., Academy of Sciences, SSSR

83
82

SILIN, V.P.

A possibility of plasma instability. Zhur. eksp. i teor. fiz.
45 no.3:816-818 S '63. (MIRA 16:10)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
(Plasma (Ionized gases))

SILIN, V.P.

Theory of oscillations of a weakly inhomogeneous plasma. Zhur.
eksp. i teor. fiz. 45 no.4:1060-1066 0 '63. (MIRA 16:11)

1. Fizicheskii institut imeni P.N.Lebedeva AN SSSR.

SILIN, V.P.; FETISOV, Ye.P.

Transient radiation and collective oscillations in metallic
films. Zhur. eksp. i teor. fiz. 45 no.5:1572-1580 N '63.
(MIRA 17:1)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

KOVRIZHNYKH, L.M.; LOVETSKIY, Ye.Ye.; RUKHADZE, A.A.; SILIN, V.P.

Hydrodynamic oscillations of an inhomogeneous low-pressure
plasma in a magnetic field. Dokl. AN SSSR 149 no.5:1052-1055 Ap '63.
(MIRA 16:5)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR. Predstavleno
akademikom M.A.Leontovichem.

(Plasma oscillations)

AL'PERT, Yakov L'vovich; GUREVICH, Aleksandr Viktorovich;
PITAYEVSKIY, Lev Petrovich; SILIN, V.P., retsenzent;
VIRKO, I.G., red.

[Artificial satellites in rarefied plasma] Iskusstven-
nye sputniki v razrezhennoi plazme. Moskva, Izd-vo
"Nauka," 1964. 382 p. (MIRA 17:6)

L 10800-65 EWT(1)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EEC(b)-2/EWA(m)-2
 PZ-6/Po-4/Pab-24/P1-4 IJP(c)/ESD(t)/SSD/AEDC(a)/AFWL/ESD(gs)/AEDC(b)/BSD/
 AFETR/ASD(p)-3/ASD(a)-5/ASD(f)-2/ASD(d)/AS(mp)-2/RAEM(a) AT
 S/0207/64/000/001/0031/0040
 ACCESSION NR: AP4C22647

AUTHOR: Silin, V. P. (Moscow)

TITLE: Kinetic theory of plasma wave interaction

SOURCE: Zhurnal priklad. mekhan. i tekhn. fiz., no. 1, 1964, 31-40

TOPIC TAGS: kinetic theory, plasma wave interaction, approximation, ionic sonic oscillation, electron temperature, ion temperature, plasma oscillation, oscillation amplitude, plasma instability, nonlinear effect, Coulomb interaction, correlation function, plasma, wave interaction

ABSTRACT: In many cases of appreciable oscillation of a plasma it is necessary to take into account the role of nonlinear effects. The author gives a statistical description up to second order for the plasma particles describing nonlinear interaction of plasma oscillations with Coulomb interaction when the problems of self influence and their related divergences do not arise. His results are based on numerous approximations. Orig. art. has: 23 formulas.

ASSOCIATION: none

SUBMITTED: 07Jun63

SUB CODE: ME
 Card 1/1

NO REF SOV: 012

ENCL: 00

OTHER: 004

1 22869-65 EEC(b)-2/EWG(k)/EPA(w)-2/EWT(1)/EEC(t)/EPA(sp)-2/T/EWA(n)-2 P1-4/
ACCESSION NR: AP5002313 Po-4/Pz-6/Pab-10 IJP(c) S/0141/64/007/005/0822/0827

AUTHOR: Lovetskiy, Ye. Ye.; Silin, V. P.

TITLE: Oscillations of a plasma with weak multi-dimensional inhomogeneity

SOURCE: IWUZ. Radiofizika, V. 7, no. 5, 1964, 822-827

TOPIC TAGS: plasma oscillation, plasma stability, oscillation spectrum,
magnetohydrodynamic wave, magnetoactive plasma

ABSTRACT: The authors consider the spectra of the natural oscillations of a multi-dimensional weakly-inhomogeneous plasma, in the geometrical-optics approximation, for the case when the differential equations have an order higher than the second. A general relation is first described for the spectra of the higher-order differential equations. The formulas for the spectra derived from this relation are then used to analyze high-frequency oscillations of a magnetoactive rarefied plasma, quasi-longitudinal oscillations of a magnetoactive plasma with account of spatial dispersion, and magnetohydrodynamic waves. It is pointed out that the results are not applicable to differential equations of the hyperbolic

Card 1/2

L 22879-65

ACCESSION NR: AP5002313

type, when divergent integrals may be obtained. Orig. art. has: 2 figures and 14 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute AN SSSR)

SUBMITTED: 20Jul63

ENCL: 00

SUB CODE: ME

NR REF SOV: 003

OTHER: 000

Card 2/2

L 16456-65 EAT(1)/EEC(t) Peb IJP(c)/ESD(t)/AFWL/ASD(a)-5

ACCESSION NR: AP4042053

S/0126/64/017/006/0934/0935

AUTHOR: Zyryanov, P. S. ; Silin, V. P. 13

TITLE: On the quantum theory of thermomagnetic ²¹ phenomena in semiconductors and metals

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 6, 1964, 934-935

TOPIC TAGS: thermomagnetic phenomena, semiconductor, metal, heat flux, conductivity current, molecular current

ABSTRACT: In both the classical and the quantum theory of thermomagnetic phenomena, the expressions for the volume densities of the thermal flux and of the conductivity current must be determined. These fluxes are needed in the study of the transfer of heat and charge in a magnetic field. As the authors have shown (FMM, 16, 5, 798 (1963); ZhETF 42, 2 (1964)), in addition to the conductivity current, there is, in a magnetic field, in the volume density of the charge flux the "molecular" current curl M. There is also the energy flux connected with Landau diamagnetism. In the present paper, the authors give the mathematical

Card 1/2

L 16456-65

ACCESSION NR: AP4042053

expression for the separation of the heat flux (kinetic energy of heat motion) and of the conductivity current of the volume density of the charge and energy fluxes. It follows that the current density consists of the conductivity current and of the molecular current curl M . The different terms of the expression found have each a physical meaning. Orig. art. has: 10 equations

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals AN SSSR)

SUBMITTED: 24Jan64

ENCL: 00

SUB CODE: IC, EM

NO REF SOV: 004

OTHER: 000

Card 2/2

ACCESSION NR: AP4013407

S/0057/64/034/002/0236/0247

AUTHOR: Silin, V.P.

TITLE: On weakly damped plasma waves

SOURCE: Zhurnal tekhn.fiz., v.34, no.2, 1964, 236-247

TOPIC TAGS: plasma, plasma wave, damped plasma wave, weakly damped plasma wave, Langmuir wave, ionic sound, Cerenkov absorption, inverse Cerenkov effect

ABSTRACT: This paper discussed the propagation and damping in a non-uniform plasma of the following two kinds of waves: 1) high frequency Langmuir waves; 2) low frequency waves for which the phase velocity is much greater than the ion thermal velocity and much less than the electron thermal velocity (ionic sound). These waves and their damping have previously been treated for a uniform plasma, and the results of the present paper reduce in the uniform case to previously known results. The treatment is based on the linearized kinetic equation with a self-consistent field and no external field. The velocities are assumed to be isotropically distributed, but the temperatures, as well as the density, may vary with position. The dielectric tensor is derived, and then simplified in different ways, depending on

Card 1/3

AP4013407

the type of waves treated. In expanding the dielectric tensor in inverse powers of the frequency in order to discuss the high frequency Langmuir waves, "a certain care" was exhibited in order not to lose the terms responsible for the inverse Cerenkov effect. From the dielectric tensor, the wave equation is derived. This is solved first with the damping term neglected, and the latter is subsequently evaluated by a first order perturbation calculation. The non-uniformity of the plasma is assumed to be restricted to one dimension, i.e., the temperatures and density are assumed to be functions of only one Cartesian coordinate. The wave equation is solved in the approximation of geometric optics (WKB approximation). This approach is of particular interest when a region in which the waves propagate is bounded at both ends by regions in which they do not. For such cases, formulas are derived for calculating the frequencies of the proper oscillations and the rates at which they are damped. As an example, the proper frequencies and damping constants are derived for a uniform temperature Maxwell plasma in which the density $N(x)$, is given near the origin by

$$N(x) = \frac{N_0}{1 - \left(\frac{x}{d}\right)^2} \quad (x < d).$$

The formula obtained for the damping constant is very different from that which ap-

Card 2/3

AP4013407

plies in a uniform plasma, although the constant itself is small in both cases. The damping of longitudinal Langmuir waves is due mainly to absorption by particles with velocities approximately equal to the phase velocity of the waves (Cerenkov absorption, inverse Cerenkov effect). This mechanism does not operate with the transverse Langmuir waves. It is found that the velocity of ionic sound is not isotropic in a non-uniform plasma. The Stokes phenomenon for the fourth order wave equations involved in this treatment is discussed very briefly. Orig.art.has: 68 formulas.

ASSOCIATION: Fizicheskii institut im.P.N.Lebedeva, Moscow (Physical Institute)

SUBMITTED: 14Dec62

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: PH

NR REF SOV: 003

OTHER: 004

Card^{3/3}

S/0057/64/034/003/0385/0394

ACCESSION NR: AP4020563

AUTHOR: Gorbunov, L.M.; Silin, V.P.

TITLE: Theory of transport phenomena in a completely ionized non-isothermal plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v.34, no.3, 1964, 385-394

TOPIC TAGS: plasma, plasma transport phenomena, plasma resistivity, plasma heat conductivity, plasma viscosity, nonisothermal plasma transport, completely ionized plasma, plasma oscillation, plasma oscillation electron interaction

ABSTRACT: The current density, heat flux, and viscosity are calculated for a completely ionized plasma in which the electron temperature, T_e , may differ from the ion temperature, T_i . In addition to two-body collisions, the interaction of the charged particles with the plasma oscillations is taken into account. This interaction is found to play a dominant role when $T_e \gg T_i$. The transport coefficients are calculated by the method of Chapman and Enskog. The kinetic equation, with a previously published collision integral (V.P.Silin, ZhETF, 1768, 1962) that takes into account the polarization of the plasma, and hence the plasma oscillations, is linearized with respect to small deviations of the distribution function from a local-

Card 1/3

ACCESSION NR: AP4020563

ly Maxwellian form. The correction to the distribution function is expanded in a series of Sonine-Laguerre polynomials (of index $3/2$ for calculating the current and the heat flux, and index $5/2$ for calculating the viscosity) and equations are derived for the expansion coefficients. Approximate solutions of these equations are obtained, different methods of approximation being employed for various values of T_e/T_i , and the transport coefficients are calculated. When $T_e = T_i$, the interaction of electrons with the plasma oscillations has very little effect. When this interaction is neglected, the results of S.I.Braginskiy (ZhETF 33,459,1957) and Ye.S. Fradkin (Ibid.32,1176,1957) are obtained. When T_e/T_i is between about 10 and 100, the effect of the interaction with the plasma oscillations may be treated as a correction, but it is not small. For large values of T_e/T_i , the plasma oscillation interaction becomes the dominant effect, and in the appropriate limit for very large T_e/T_i , the earlier results of the authors (V.P.Silin and L.M.Gorbunov, DAN SSSR, 145,No.6,1962) are obtained.. Orig.art.has: 66 formulas and 1 table.

Card 2/3

ACCESSION NR: AP4020563

ASSOCIATION: Fizicheskiy institut im.P.N.Lebedeva AN SSSR Moscow (Physical Institute, AN SSSR)

SUBMITTED: 14Dec62

DATE ACQ: 31Mar64

ENCL: 00

SUB CODE: PH

NR REF SOV: 012

OTHER: 000

Card 3/3

ACCESSION NR: AP4019218

S/0056/64/046/002/0537/0543

AUTHORS: Zy*ryanov, P. S.; Silin, V. P.

TITLE: Quantum theory of transport phenomena in strong magnetic fields

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 537-543

TOPIC TAGS: transport theory, transport quantum theory; thermomagnetism, galvanomagnetism, collisionless flow, collisionless electric current, collisionless heat flow, particle level quantization, Einstein diffusion relation, Landau diamagnetism, chemical potential gradient, temperature gradient, electric field gradient

ABSTRACT: Expressions are considered for the electric and heat currents due to electrons in a magnetic field strong enough to require that quantization of the particle levels in the field be taken into account. The expressions derived do not depend on the collisions be-

Card. 1/2

ACCESSION NR: AP4019218

tween the electrons and the scatterers; in this case the result obtained is the same as that of A. I. Ansel'm and B. M. Askerov (FTT, v. 3, 3668, 1961). In addition, the use of the method of kinetic equations to obtain collisionless particle and heat flows is also considered. The currents produced by statistical forces proportional to the gradients of the temperature and the chemical potential are first evaluated and then added to the currents induced by the electric field. The violation of Einstein's diffusion relations in the case when the quantization of the orbital electronic motion is essential is discussed and is shown to be due to Landau diamagnetism. Orig. art. has: 19 formulas.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AN SSSR)

SUBMITTED: 25May63

DATE ACQ: 27Mar64

ENCL: 00

SUB CODE: PH

NO REF SOV: 004

OTHER: 002

Cord. 2/2

ACCESSION NR: AR4042389

S/0056/64/047/001/0200/0211

AUTHOR: Gorbunov, L. M.; Silin, V. P.

TITLE: Nonlinear interaction between plasma waves

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 1, 1964, 200-211

TOPIC TAGS: plasma wave interaction, nonlinear plasma interaction, isotropic plasma oscillation, Langmuir plasma oscillation, plasma stability

ABSTRACT: An investigation of the nonlinear interaction between plasma waves shows that for high-frequency electron Langmuir oscillations of isotropic plasma in the first nonvanishing approximation of the exponential expansion of the square of the ratio of the Debye radius to the wavelength $(r_D/\lambda)^2$, a pumping from short to long waves takes place in the spectrum. The waves with parallel and mutually perpendicular wave vectors do not interact in this case. Such waves interact only in the next approximation. The energy attenuation of Langmuir oscillations appears in the same approximation. The investigation of a plasma-slow beam system with a velocity below that of

1/2
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L 15310-65 EWT(1)/EWG(k)/EPA(sp)-2/EPA(w)-2/EEC(t)/T/EEC(b)-2/ENA(m)-2
Pz-6/Po-4/Pab-10/Pi-4 IJP(c)/SSD(b)/BSD/AFWL/EDC(b)/SSD/ASD(p)-3/AFETR/
PAEM(a)/ESD(gs)/ESD(t) AT
ACCESSION NR: AP4047911 S/0056/64/047/004/1437/1453,

AUTHORS: Gorbunov, L. M.; Pustovalov, V. V.; Silin, V. P.

TITLE: Nonlinear interaction of electromagnetic waves in a plasma 21

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47,
no. 4, 1964, 1437-1453

TOPIC TAGS: plasma wave propagation, plasma electromagnetic wave,
plasma oscillation, nonlinear plasma

ABSTRACT: The theory developed is based on the equations of non-linear electrodynamics, the statistical averaging of which yields a nonlinear equation for the evolution of electromagnetic-field fluctuations. Principal attention is paid to the interaction of long transverse waves with either transverse or longitudinal waves. The approach is similar to that used in an earlier paper by Gorbunov and Silin (Preprint FIAN, A-8, 1964; ZhETF v. 47, 203, 1964), ex-

G/8

L 15310-65
ACCESSION NR: AP4047911

cept that in addition to taking into account the Coulomb interaction of the plasma particles, the authors determine, in the present work, first, the role played by the formation of transverse waves through coalescence of longitudinal waves, and second, the conditions under which the nonlinear interaction is determined by the intermediate transverse wave. The interaction between long transverse and longitudinal Langmuir waves in a plasma is then considered and the conditions under which scattering of the oscillations by the ions predominates determined. It is shown that this scattering exceeds by several orders of magnitude the interaction between the oscillations and electrons. The conditions under which the time of transformation of the oscillations is determined by the interactions with the electrons, characterized by the intermediate transverse waves, are ascertained. This is followed by an examination of the merging of a longitudinal and long transverse wave to form a transverse wave, and by a study of induced scattering of longitudinal waves. It is shown that in this case an important role is played by the interaction

Card 2/3

L 15310-65

ACCESSION NR: AP4047911

with the intermediate transverse wave. The latter effect was not observed before because the analysis was either confined to the scattering by longitudinal plasma fluctuations, or to short wavelengths. Orig. art. has: 57 formulas.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR)

SUBMITTED: 13Apr64

ENCL: 00

SUB CODE: ME

NR REF SOV: 018

OTHER: 002

Card 3/3

L 63549-65 EWT(1)/EWG(m)/EPF(n)-2/EPA(w)-2 Pz-6/Po-4/P1-4 IJP(c) WW/AT
ACCESSION NR: AP5001849 S/0056/64/047/006/2254/2265

AUTHOR: Silin, V. P.

TITLE: Nonlinear high-frequency plasma conductivity

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 6, 1964, 2254-2265

TOPIC TAGS: plasma conductivity, nonlinear analysis, high frequency plasma, plasma electron oscillation, electron ion collision, polarization

ABSTRACT: A nonlinear theory is developed for the conductivity of a fully ionized plasma in a strong high-frequency field, such that the velocity of the electron oscillations induced by the field is appreciably larger than the thermal velocity. The time dependent plasma conductivity caused by the electron-ion collision is determined, and it is shown that the time dependence leads to the occurrence of higher harmonics. In particular, the oscillations of the absolute velocity of the electrons may give rise to odd current harmonics, which in turn lead to the appearance of field harmonics. The dependence of the nonlinear current on the

Card 1/2

L 63549-65

ACCESSION NR: AP5001849

polarization and on the constant magnetic field is determined. It is pointed out that the cause of nonlinear conductivity discussed in this paper can manifest itself in many other kinetic characteristics, and not alone in the case of a fully ionized plasma. Orig. art. has: 58 formulas and 1 table. [02]

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 23Jun64

ENCL: 000

SUB CODE: ME, EM 00

NO REF SOV: 005

NR ROTHER: 001

ATD PRESS: 4049 001

dm
Card 2/2

ACCESSION NR: AP4024575

S/0053/64/082/003/0499/0535

AUTHOR: Rukhadze, A. A.; Silin, V. P.

TITLE: The geometrical optics method in the electrodynamics of inhomogeneous plasma

SOURCE: Uspekhi fizicheskikh nauk, v. 82, no. 3, 1964, 499-535

TOPIC TAGS: plasma, inhomogeneous plasma, isotropic plasma, confined plasma, inhomogeneous plasma electrodynamics, geometrical optics method, quasiclassical quantization rule, Bohr-Sommerfeld phase integral, plasma oscillation spectrum, plasma potential oscillations, plasma nonpotential oscillations, plasma instability, plasma drift instability

ABSTRACT: Whereas earlier studies of the electrodynamics of media with spatial dispersion were limited to homogeneous media with either infinite or distinctly defined boundaries, the introduction of geometrical-optics methods has made possible noticeable progress in the development of a theory of electromagnetic properties of weakly inhomogeneous plasmas. This review article details the principles of

Card 1/82

ACCESSION NR: AP4024575

the geometrical-optics method as applied to media with spatial dispersion and treats the concrete problem of oscillations in a weakly inhomogeneous plasma confined by a strong magnetic field. The spectral characteristics of natural oscillations of the plasma are derived in terms of the Bohr-Sommerfeld phase integrals (quasiclassical quantization rules) and are used to establish the conditions under which a weakly inhomogeneous plasma is unstable. The analysis is limited to the one-dimensional case. The section headings are: 1. Method of geometrical optics in the electrodynamics of media with spatial dispersion, and the permittivity tensor of a weakly inhomogeneous plasma confined by a strong magnetic field. 2. Quasiclassical quantization rules and the oscillation spectrum of an isotropic inhomogeneous plasma. 3. Oscillation spectrum of inhomogeneous magnetoactive plasma. 4. Spectrum of low-frequency potential drift oscillations of an inhomogeneous plasma. 5. Nonpotential drift oscillations of an inhomogeneous plasma. 6. Effect of non-parallel magnetic flux lines; stabilization of drift oscillations. Orig. art. has: 125 formulas and 1 table.

Card 2/82

L 39447-65 EFF(n)-2/EPA(w)-2/ENT(1)/EMO(m) P1-4/Po-4/Pz-6/Pab-10 IJP(c)
 AT/WW S/0139/65/000/001/0021/0031
 ACCESSION NR: AP5006047 39
 38

AUTHOR: Silin, V. P.

TITLE: Triple correlations in a plasma and "collision integral" for the pair B
 correlation function 21

SOURCE: IVUZ. Fizika, no. 1, 1965, 21-31

TOPIC TAGS: triple correlation, pair correlation, plasma particle interaction,
 plasma kinetic equation, plasma field fluctuation

ABSTRACT: The equation for the triple correlation function of a system of charged particles interacting in accordance with Coulomb's law is solved, with account of dynamic polarization effects, and used to derive an equation for the pair correlation function of a system of charged particles. The latter is an analog of the kinetic equation for the simple distribution function, and its derivation is analogous in some sense to the derivation of the hydrodynamic equations from the kinetic equation. This investigation was motivated by the increasing use of problems involving field fluctuations in plasma kinetics, since the field fluctuations are essentially determined by particle pair correlations. Equations for the dis-

Card 1/2

L 39447-65

ACCESSION NR: AP5006047

tribution functions of the individual species of particles are derived from the Liouville equation, neglecting four-particle correlation and neglecting interactions at short distances. The equation for the pair correlation function is nonlinear and is much more complicated than the usual kinetic equation. Conditions under which the pair-correlation equation can be solved are indicated, and a solution is given for some special cases. The results are used in another paper by the author (PMFT no. 1, page 31, 1964), where an equation describing the time evolution of plasmons is obtained with the aid of the collision integral for the pair correlation function. Orig. art. has: 30 formulas.

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedeva (Physics Institute)

SUBMITTED: 28May63

ENCL: 00

SUB CODE: ME, NP

NR REF SOV: 002

OTHER: 000

Card 2/2 (m)

1. 2735-66 SWI(1)/LTC/EDT(1)-2/ENC(m)/EPA(v)-2 LJP(c) AT
 ACCESSION NR: AP5024337 UR/0367/65/002/002/0250/0256

AUTHOR: Gurevich, A. V.; Silin, V. P.

TITLE: Radiation acceleration of a plasma

SOURCE: Yadernaya fizika, v. 2, no. 2, 1965, 250-256

TOPIC TAGS: plasma physics, plasma acceleration, plasma stability, plasma electro-magnetic wave

ABSTRACT: The authors discuss some of the physical problems associated with the radiation mechanism of plasma acceleration. In contrast to theories already published, an attempt is made to explain processes associated with the fact that the accelerated materials is an ionized gas in which acceleration causes internal motions in addition to transposition of the entire mass. It is felt that these internal motions have a considerable effect on the dynamics of plasma acceleration. It is assumed that a plane electromagnetic wave with frequency ω is incident on a half-space completely filled with an ionized plasma. The authors limit themselves to the case of frequencies at which the plasma is opaque to radiation. In other words, the frequency of the external field ω is small in comparison with the Langmuir fre-

Card 1/2

L 2735-66

ACCESSION NR: AP5024337

quency of the electrons $\omega_{Le} = (4\pi e^2 N / m)^{1/2}$.
 The equations derived are applied to a restricted plasma. Consideration is given to deformation of the plasma layer as a result of thermal motion of ions and irregular motion of the field-plasma interface in an inhomogeneous plasma. Dissipative processes and problems of stability in the accelerated plasma are considered. It is found that heating of the plasma due to collisions has little effect on the proposed mechanism of acceleration, while instability due to interpenetrating plasmas, strong alternating electric fields and various other factors has a considerable effect on the possibilities of this acceleration mechanism. It is noted that acceleration efficiency may be improved as the average velocity of the plasma layer increases, since the fraction of the wave momentum lost to acceleration is proportional to V/c where V is the velocity of the boundary with respect to the plasma. However, this is a relativistic effect and therefore is beyond the scope of this paper. "The necessity for this last remark was seen after discussion of the work with Academician V. I. Veksler, to whom we are deeply grateful." Orig. art. has: 8 formulas.

ASSOCIATION: ⁴⁵⁵Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 20Feb65

NO REF SOV: 010

ENCL: 00

OTHER: 001

SUB CODE: ME

Card 2/2

L 63114-65 ENT(1)/EMP(n)-2/ENG(m)/EPA(w)-2 LJP(c) AT

ACCESSION NR: AP5020358

UR/0141/65/008/003/0461/0468
621.371.18

AUTHOR: Gorbunov, L. M.; Pustovalov, V. V.; Silin, V. P.

TITLE: Scattering of electromagnetic waves in a plasma 21

SOURCE: IVUZ. Radiofizika, v. 8, no. 3, 1965, 461-468

TOPIC TAGS: plasma physics, scattering cross section, electromagnetic wave scattering

ABSTRACT: The scattering of waves in a plasma has been attracting increasing attention. It is possible to express the scattering cross section by means of a nonlinear equation describing the time variation of the spectral density of the square of the electromagnetic field fluctuations in the plasma. Using nonlinear integral equations describing the interaction of electromagnetic waves in a plasma, the authors have found the scattering cross sections of Langmuir and transverse waves with frequencies close to the Langmuir electron frequency. It is noted that the scattering of waves in a plasma can also be studied by means of a procedure developed by Gaylitis and Tsytovich (in publication) applicable to the problem of genera-

Card 1/2

L 63114-65

ACCESSION NR: AP5020358

tion of non-polarized radiation when charged particles are scattered by longitudinal waves in an isotropic plasma. Orig. art. has: 29 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 12Sep64

ENCL: 00

SUB CODE: EM, ME

OTHER: 001

NO REF SOV: 009

960
Card 2/2

L 50522-65 EWT(1)/EPF(n)-2/EWG(m)/EPA(w)-2 Pz-6/Po-4/Pab-10/P1-4 IJP(e)
 ACCESSION NR: AP5010159 WW/AT UR/0020/65/161/002/0328/0331
 46
 15
 B

AUTHOR: Silin, V. P.

TITLE: Conductivity of a plasma in strong electric and magnetic fields

SOURCE: AN SSSR. Doklady, v. 161, no. 2, 1965, 328-331

TOPIC TAGS: plasma conductivity, plasma field interaction, plasma wave propagation, plasma nonlinearity

ABSTRACT: The author determines the conductivity of a plasma in a strong constant and homogeneous magnetic field, under conditions when a strong high-frequency wave with circular polarization propagates along the magnetic field. The generalized Ohm's law for the plasma in a strong field is obtained with the aid of Boltzmann's equation. Spatial dispersion is neglected and the analysis is limited to the case of frequencies low compared with the electronic Langmuir frequency of the plasma, and to the case of singly-ionized ions. The calculations show that in strong electric and magnetic fields the conductivity depends in nonlinear fashion on the electric field intensity. If the nonlinearity is strong, the dependence on the electric field is brought about by the fact that the field intensity determines

Card 1/2

L 50522-65

ACCESSION NR: AP5010159

the velocity of the colliding particles. If the nonlinearity is weak, the dependence on the electric field arises when such a field takes the colliding particles outside the collision regions. This report was presented by I. Ye. Tamm. Orig. art. has: 27 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 07Aug64

ENCL: 00

SUB CODE: ME, EM

NR REF SOV: 005

OTHER: 000

ml
Card 2/2

1-62551-65 EPF(n)-2/EPA(w)-2/ENT(1)/ENG(m) PI-4/PO-4/PZ-6 IJP(c) AT
 ACCESSION NR: AP5018188 UR/0207/65/000/003/0003/0010

AUTHORS: Giorgadze, N. P. (Moscow, Tiflis); Silin, V. P. (Moscow, Tiflis) 45

TITLE: On nonlinear fluctuations in a plasma with Coulombic interaction B

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1965, 3-10

TOPIC TAGS: plasma, Coulomb interaction, nonlinear oscillation, Fourier analysis, correlation function

ABSTRACT: The nonlinear fluctuations of a two-component plasma are studied analytically. The state of the plasma is expressed in terms of the phase density

$$N_a(r, p, t) = \sum_i \delta(r - r_{ai}(t)) \delta(p - p_{ai}(t))$$

This density is then represented as the sum of a mean density and a fluctuation term around this mean

$$N_a = \langle N_a \rangle + \delta N_a$$

The plasma is assumed to be quasi-neutral and a two-time correlation is defined as follows

$$\langle \delta N_a(r, p, t) \delta N_a(r', p', t') \rangle$$

Card 1/3

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ACCESSION NR: AP5018188

To estimate the fluctuations, an initial condition is given

$$\delta N_a(r, p, t=0) = \delta N_a(r, p, 0),$$

and the solution is carried out by taking the Fourier transforms of the density fluctuations with respect to time as well as the space coordinates. Equations are obtained of the form

$$\begin{aligned} \langle \delta N_a(r, p, t) \delta N_b(r', p', 0) \rangle &= \int \frac{d^3k d\omega}{(2\pi)^4} e^{i(k(r-r')-\omega t)} \times \\ &\times \left[\chi_{ab}(k, \omega + i0, p, p', r') - \frac{4\pi}{k^2} e_a n_a k \frac{\partial}{\partial p} \frac{\partial f_a(\delta p \delta N_b(p))_{p, \omega + i0, r'}}{\omega - kv + i0} \right] \\ \chi_{ab}(k, \omega + i0, p, p', r') &= \chi_{ab}^{(1)}(k, \omega + i0, p, p') + \\ &+ \chi_{ab}^{(2)}(k, \omega + i0, p, p', r') \\ \chi_{ab}^{(1)}(k, \omega + i0, p, p') &= \frac{i}{\omega + i0 - kv} [\delta_{ab} \delta(p - p') n_b / \epsilon + \\ &+ n_a n_b G_{ab}(k, p, p')] \\ \chi_{ab}^{(2)}(k, \omega + i0, p, p', r') &= \frac{i}{\omega + i0 - kv} e^{ikr} \frac{4\pi i e_a}{(2\pi)^3} \int \frac{dk'}{(k')^2} \times \\ &\times k' \frac{\partial}{\partial p} \langle Q_a(k - k', k', p, \omega) \delta N_b(r', p', 0) \rangle \end{aligned}$$

Card 2/3

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ACCESSION NR: AP5018188

$$\chi_{ab}^{(2)}(k, \omega + i0, p, p', r') = \chi_{ab}^{(1)}(k, \omega + i0, p, p') = -\frac{4\pi}{(2\pi)^3} \int \frac{dk'}{(k')^2} \times$$

$$\times \left[\frac{e_a}{\omega - kv + i0} k' \frac{\partial}{\partial p} \sum_e e_s \int dp_1 \frac{N_{acb}(k, k', p, p_1, p')}{(\omega - \Delta kv - k'v_1 + i0) e(\omega - \Delta kv + i0, k')} + \right.$$

$$\left. + \frac{4\pi}{(\Delta k)^2} \frac{1}{2\pi i} \int du \frac{k' \eta_a(\omega + i0, k, \omega - u + i0, \Delta k, v)}{e(\omega - u + i0, \Delta k) e(u + i0, k')} \times \right.$$

$$\left. \times \sum_e e_s \int dp_1 \sum_{e'} e_{s'} \int dp_2 \frac{N_{acb}(k, k', p_1, p_2, p')}{(\omega - u - \Delta kv_2 + i0) (u - k'v_1 + i0)} \right]$$

which represent the two-time correlators of phase density in terms of correlation functions and represent the actual solution of the nonlinear problem. Orig. art. has: 32 equations.

ASSOCIATION: none

SUBMITTED: 16Jun64

NO REF SOV: 012

ENCL: 00

OTHER: 003

SUB CODE: ME

Card 3/3

L 6 139-65 EPF(n)-2/EPA(w)-2/EWT(1)/EKG(m) IJP(c) AT
 S/0056/65/048/003/0901/0912
 32
 31
 8
 ACCESSION NR: AP5008749

AUTHOR: Aliyev, Yu. M.; Silin, V. P.

TITLE: Plasma oscillations in a high-frequency electric field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 3, 1965,
 901-912

TOPIC TAGS: electric field, plasma physics, plasma, plasma oscillation

ABSTRACT: The potential oscillations of a fully ionized plasma in a strong, high-frequency electric field are studied. It is shown that the relative oscillations of the plasma particles in an external field may cause spatial dispersion. A high-frequency field alters the shape of the branches of the oscillations, and a new branch appears. In the region of longer wavelengths, the new branch is very similar to ion sound, except that the magnitude of the electron displacement during the oscillation period of the external field serves as the Debye radius. It is also shown that a high-frequency field has a stabilizing effect on beam instability in a plasma where the electrons are in motion relative to the ions. "The authors thank A. A. Rukhadze for useful discussion of problems encountered in the work." Orig. art. has: 61 formulas. [14]

Card 1/a

L 61139-45

ACCESSION NR: AP5008749

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics
Institute, Academy of Sciences, SSSR)

SUBMITTED: 09Sep64

ENCL: 00

SUB CODE: ME, EM

NO REF SOV: 010

OTHER: 001

ATD PRESS: 4070

Card 2/2

L 5411-66 ENT(1)/ETC/EPF(n)-2/ENG(m)/EPA(w)-2 IJP(c) AT

ACCESSION NR: AP5019233

UR/0056/65/049/001/0193/0209

AUTHOR: Silin, V. P.; Shister, A. R.

TITLE: Contribution to the theory of transverse diffusion and of static and high-frequency conductivity of a plasma situated in a strong magnetic field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 1, 1965, 193-209

TOPIC TAGS: plasma conductivity, plasma diffusion, plasma magnetic field, ionized plasma

ABSTRACT: The authors develop the theory of diffusion and conductivity of a fully ionized non-isothermal plasma situated in a magnetic field such that the Larmor radii of the particles become comparable with or even smaller than the Debye screening radius. Unlike other investigations, the present analysis gives rise also to additive terms proportional to the ratio of the difference between the electron and ion temperatures to the ion temperature. Consequently, if the electron temperature (T_e) is one order of magnitude larger than the ion temperature (T_i) the transverse collision frequency, which determines the transverse diffusion and transverse conductivity, turns out to be proportional to $T_e^{1/2} T_i^{-1}$. Another difference is that the frequency range covered is larger, account is taken of the in-

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L 5414-66

ACCESSION NR: AP5019233

fluence of the Coulomb interaction of the particles on the time during which the colliding plasma particles interact, and weakly nonlinear effects due to outward electric drift of the particles. The results point both to an appreciable increase in the coefficient of transverse diffusion and to a qualitative dependence of the diffusion on the ion temperature. Orig. art. has: 6 formulas.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 09Jan65

ENCL: 00

SUB CODE: ME

NR REF SOV: 013

OTHER: 001

Card 2/2

L 00568-66 EPF(n)-2/EPA(w)-2/ENT(1)/ENG(m) IJP(c) AT

ACCESSION NR: AP5016562

UR/0056/65/048/006/1679/1691

AUTHOR: Silin, V. P. 44, 55

TITLE: Parametric resonance in a plasma 21, 44, 55

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 6, 1965, 1679-1691

TOPIC TAGS: plasma resonance, plasma interaction, parametric resonance, plasma electron

ABSTRACT: This is a continuation of earlier work by the author (with Yu. M. Aliyev, ZhETF v. 48, 901, 1965), in which it was shown that when the frequency of the external field is appreciably greater than the electron Langmuir frequency, the plasma can exhibit some new effects which are quite sensitive to the external field. In the present paper the author investigates one aspect of this problem which is of interest from an experimental point of view, namely the

Card 1/3

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ACCESSION NR: AP5016562

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case in which the frequency of the external electric field is comparable with the electron Langmuir frequency. The parametric resonance conditions are derived for this plasma. It is shown that the maximum growth rate of the parametric oscillations is of the order of the electron Langmuir frequency multiplied by the cube root of the electron-ion mass ratio. This maximum growth rate is obtained near resonance at harmonics of the external frequency (harmonic resonance). Far from this resonance, the maximum growth rate is of the order of the ion Langmuir frequency. The maximum growth rates are found at oscillation wavelengths approximately equal to the amplitude of the electron oscillations. In weak electric fields, where the wavelengths of the plasma oscillation are appreciably greater than the excursion of the electron in the electron field, the growth rates are much lower than the maximum. The reduction is given by the excursion/wavelength ratio raised to the two-thirds power. When the fields are very strong and the plasma oscillation wavelengths are very small, the coupling between the plasma compo-

Card 2/3

L 00568-66

ACCESSION NR: AP5016562

nents is reduced and independent oscillations of the electrons and ions are possible. In this case the ions oscillate at the ion Langmuir frequency, in agreement with the earlier results. "I thank Yu. M. Aliyev for a number of critical remarks and V. M. Volosov for valuable discussions." Orig. art. has: 68 formulas. 9

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR) 44.55

SUBMITTED: 09Jan65

ENCL: 00

SUB CODE: ME

NR REF SOV: 003

OTHER: 000

Card 3/3

GORBUNOV, L.M.; SILIN, V.P.

Instability of a plasma in a strong high-frequency field.

Zhur.eksp. i teor.fiz. 49 no.6:1973-1982 D '65.

(MIRA 19s1)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR. Submitted
July 27, 1965.

SILIN, V.P.

Ternary correlations in a plasma and the "collision integral"
for a pair-correlation function. Izv. vys. ucheb. zav.; fiz.
8 no.1:21-31 '65. (MIRA 18:3)

1. Fizicheskiy institut imeni Lebedeva AN SSSR.

L 22907-66 EWT(1) IJP(c) GG

ACC NR: AP6006876

SOURCE CODE: UR/0181/66/008/002/0623/0626

AUTHOR: Zyryanov, P. S.; Silin, V. P.

ORG: Institute of Physics of Metals, AN SSSR, Sverdlovsk (Institut fiziki metallov AN SSSR)

TITLE: Concerning the article by Yu. N. Obraztsov "Thermoelectric power of semi-conductors in a quantizing magnetic field"

SOURCE: Fizika tverdogo tela, v. 8, no. 2, 1966, 623-626

TOPIC TAGS: thermoelectric power, semiconductor conductivity, quantum theory, transport phenomenon, charged particle, *magnetic field*

ABSTRACT: The article in question was published in FTT v. 7, 573, 1965. It contained remarks concerning work by the authors of the present article dealing with certain paradoxes of quantum theory of transport phenomena. The paradox consists in the fact that the differential thermoelectric power increases without limit with increasing temperature, and Einstein's relations for the coefficients in the volume density of a flux of charges are seemingly violated. The authors reject Obraztsov's claim that some of the deductions follow from his earlier work and claim that their method is simpler than that of Obraztsov. Orig. art. has: 3 formulas.

SUB CODE: 20/ SUBM DATE: 04Oct65/ ORIG REF: 010/ OTH REF: 004

Card 1/1 *BLG*

L 25705-66 EWT(1)/ETC(f)/EPF(n)-2/ENG(m) IJP(c) AT

ACC NR: AP6002743

SOURCE CODE: UR/0056/65/049/006/1973/1982

AUTHOR: Gorbunov, L. M.; Silin, V. P.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskii institut Akademii nauk SSSR)

TITLE: Plasma instability in a strong high frequency field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 6, 1965, 1973-1982

TOPIC TAGS: plasma instability, plasma electron oscillation, plasma electromagnetics, plasma acceleration, electron plasma

ABSTRACT: This is a continuation of earlier work by one of the authors (V. P. Silin, ZhETF v. 48, 1679, 1965), who showed that irrotational oscillations can be excited when the field frequency is of the order of the electron plasma frequency or lower. The problem dealt with in the present article arises in connection with the possibility of using radiative methods for the acceleration of a transparent plasma. The authors analyze the stability of a plasma in a strong high-frequency field with respect to excitation of solenoidal oscillations. It is shown that the solenoidal oscillations can be excited when the frequency of the external field is higher than the electron plasma frequency. The resultant instability arises when the amplitude of the electron oscillations in the external field is greater than the Debye radius. The wavelength perturbations are assumed to be much smaller than the characteristic

Card 1/2

L 25705-66

ACC NR: AP6002743

2

dimensions of the plasma inhomogeneity and the results show that instabilities will arise in either a transparent plasma or an opaque plasma in a strong high-frequency field. The solenoidal instabilities have a growth rate which is smaller than that of the irrotational oscillations investigated earlier. Authors thank Yu. M. Aliyev for interest in the work and A. A. Rukhadze for valuable comments. Orig. art. has: 24 formulas.

SUB CODE: 20/ SUBM DATE: 27Jul65/ ORIG REF: 007/

Card

2/2

20

L 36391-66 INT(1) IMP(0) AF

ACC NR: AP6014034

SOURCE CODE: UR/0056/66/050/004/0943/0953

AUTHOR: Aliyev, Yu. M.; Silin, V. P.; Uotson, Kh.

ORG: Institute of Physics im. P. N. Lebedev, AN SSSR (Fizicheskiiy institut AN SSSR)

TITLE: Parametric resonance in a plasma in a magnetic field

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50, no. 4, 1966, 943-953

TOPIC TAGS: plasma magnetic field, electron motion, ion interaction, kinetic equation, parametric resonance, plasma oscillation

ABSTRACT: A theory has been developed for the oscillation and stability of a plasma in high-frequency electric, stationary magnetic, and spatially homogeneous fields. Small deviations in the system as compared with the ground state, in which a relative shift of the electrons and ions occurs due to the presence of external fields, are considered by employing a self-consistent interaction kinetic equation. A dispersion equation for the potential oscillation spectrum of such a system is obtained. The equation is solved for a cold plasma. The frequency range of an external magnetic field in which the plasma is unstable is determined. Expressions for the increments of growing potential oscillations in the instability region are obtained. Since the proper oscillations of a plasma in the magnetic field occur only in a finite frequency range, the region of the plasma instability with relatively large increments

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ACC NR: AP6014034

turns out to be much broader than in the case of a plasma in the absence of a magnetic field. The maximum value of the instability increment is plotted as a function of the external field frequency. (In this case the ratio of the square of the electron cyclotron frequency to the square of the Langmuir frequency is assumed to be 3.5.) Orig. art. has: 1 figure, 6 basic formulas, and 1 table. [Based on author's abstract]. [NT]

SUB CODE: 20/ SUBM DATE: 12Aug65/ ORIG REF: 005

Card

2/2/1965

I 33296-66 EWT(2) IJP(c) AT

ACC NR: AP6014050

SOURCE CODE: UR/0056/66/050/004/1095/1100

AUTHOR: Gorbunov, L. M. ; Silin, V. P. 60
B

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR
(Fizicheskly institut Akademii nauk SSSR)

TITLE: Scattering of waves in a plasma

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 50,
no. 4, 1966, 1095-1100

TOPIC TAGS: scattering cross section, plasma electromagnetic wave,
plasma electron, electron density, EDDY CURRENT

ABSTRACT: In view of the fact that the scattering cross sections obtained in earlier papers by the author (ZhETF v. 47, 1437, 1964; Radiofizika v. 8, 461, 1965) lead to results that do not coincide with those obtained by others, the author presents a comparison of the results of the different approaches and demonstrates the correctness of his own procedure with the aid of the method used in the papers by others. It is shown that for a complete description of the scattering and transformation of electromagnetic waves in a plasma it is necessary to take into account not only the electron-number density fluctuation but also the fluctuations of the eddy current produced in the plasma. The

Card 1/2

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ACC NR: AP6014050

discrepancy between the concrete results of the author's papers and those by others is connected with the fact that the wave in the plasma, is determined by both factors and not by one, owing to thermal-motion effects (spatial-dispersion effects), scattering cross section. Only when account is taken of the eddy-current fluctuations is it possible to obtain complete expressions for the scattering of longitudinal and transverse waves in the plasma. To illustrate his approach, the author analyzes the scattering of an unpolarized transverse wave with formation of a wave which is also transverse, for the case when the frequency of the waves is large compared with the Langmuir frequency. Orig. art. has: 22 formulas.

SUB CODE: 20/ SUBM DATE: 11Nov65/ ORIG REF: 013/ OTH REF: 003

Card

2/2

ACC NR: AP7008878

SOURCE CODE: UR/0020/66/169/003/0552/0561

AUTHOR: Rukhadze, A. A.; Silin, V. P.

ORG: Physics Institute im. P. N. Levedev, Academy of Sciences USSR (Fizicheskii institut AN SSSR)

TITLE: Effect of Coulomb collisions on the drift instability of plasmas

SOURCE: AN SSSR. Doklady, v. 169, no. 3, 1966, 558-561

TOPIC TAGS: Coulomb collision, plasma instability

SUB CODE: 20

ABSTRACT: The effect of charged particle collisions on the drift instability of plasmas was calculated earlier using the model collision integral (see, e. g., T. E. Stringer, Bull. Am. Phys. Soc., 10, 208, 1965; P. L. Batnagar et al., Phys. Rev., 94, 511, 1954). However, such a collision integral does not allow the study of effects connected with the temperature inhomogeneity of plasmas and often leads to incorrect results. The authors use the Landau collision integral (L. D. Landau, ZhEFT, 7, 206, 1936) and restrict their inquiry to low-pressure plasmas. The instability consists of the excitation of potential oscillations; the effective particle collision frequencies are small compared with Larmor frequencies. The analysis of oscillation spectra is carried out in a geometrical optics approximation. An analysis of expressions derived from the eikonal equation yields conditions under which the electron and ion collisions damp out or excite oscillations. Graphs show the stability boundaries of the plasma. This paper was presented by Academician I. Ye. Tamm on January 7, 1966. Orig. art. has: 2 figures and 21 formulas. [JPRS: 38,417]

UDC: 533.951.8

Card 1/1

ACC NR: AP7003224

SOURCE CODE: UR/0056/66/051/006/1842/1851

AUTHOR: Silin, V. P.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Kinetic instability of a plasma situated in a strong high-frequency field

SOURCE: Zh eksper i teor fiz, v. 51, no. 6, 1966, 1842-1851

TOPIC TAGS: plasma instability, plasma interaction, Cerenkov effect, dispersion equation, electron interaction

ABSTRACT: This is a continuation of an earlier study of plasma stability in a high-frequency field (ZhETF v. 48, 1679, 1965), where the possible existence of a non-hydrodynamic instability against buildup of potential-field oscillations was demonstrated. It is shown in the present article that a transparent nonisothermal plasma situated in a strong high-frequency field is unstable against potential oscillations if the frequency of the external field is not too high. This instability is due to the Cerenkov effect on the plasma particles and is kinetic in this respect. The analysis is based on the dispersion equation for the potential oscillations derived in the earlier paper. It is also shown that a similar instability can arise also in a plasma whose electron Langmuir frequency is lower than the frequency of the external field. The regions of plasma parameters within which the instability can arise are delineated. Orig. art. has: 2 figures, 40 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 22Jun66/ ORIG REF: 003

Card 1/1

BAGDASAROV, S.M.; MARGOLIN, S.I.; SILIN, V.S.; VAKHRUSHIN, N.P.,
spetsred.; GURKOVA, O.A.; ~~_____~~

[New machines and devices for repairing road and bridge
structures] Novye mekhanizmy i prispособleniya dlia re-
monta dorozhno-mostovykh sooruzhenii. Moskva, Izd-vo M-va
kommun.khoz.RSFSR, 1950. 44 p. (MIRA 16:8)

1. Russia (1917- R.S.F.S.R.) Ministerstvo kommunal'nogo
khozyaystva. Tsentral'naya normativno-issledovatel'skaya
stantsiya.

(Road machinery)

POLOZOV, I.T., glavnyy metodist; GRIGOR'YEV, V.V., otvetstvennyy redaktor;
SILIN, V.S., redaktor; VESKOVA, Ye.I., tekhnicheskii redaktor

[The "Uzbek S.S.R." pavilion; a guidebook] Pavil'on "Uzbekskaya SSR";
putevoditel'. Moskva, Gos. izd-vo selkhoz. lit-ry, 1956. 26 p.
(MIRA 9:12)

1. Moscow. Vsesoyuznaya sel'skokhozyaystvennaya vystavka, 1954-
(Uzbekistan--Agriculture)
(Moscow--Agricultural exhibitions)

BREMER, Georgiy Ivanovich, doktor tekhnicheskikh nauk, professor;
ZHELIGOVSKIY, V.A., professor, retsenzent; ~~SILIN, V.S.~~ inzhener,
redaktor; UVAROVA, A.F., tekhnicheskij redaktor

[Separators] Zhidkostnye separatory. Moskva, Gos. nauchno-tekhn.
izd-vo mashinostroit.lit-ry, 1957. 242 p. (MLRA 10:7)
(Separators (Machines))

ZAKHAROV, Vladimir Dmitriyevich, konstruktor; FISHBEYN, Pavel Aref'yevich, konstruktor; SMELYANSKIY, V.A., red.; SILIN, V.S., red.; GUREVICH, M.M., tekhn.red.

[Engines of self-propelled combines] Dvigateli samokhodnykh kombinov. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 278 p.
(MIRA 12:9)

1. Ural'skiy avtomobil'nyy zavod (for Zakharov, Fishbeyn).
(Combines (Agricultural machinery)) (Gas and oil engines)

STEPANITSKIY, Yakov Moiseyevich; FUDIMAN, Grigoriy Moiseyevich;
DUBROVSKIY, V.A., red.; SILIN, V.S., red.; BALLOD, A.I.,
tekhn.red.

[Tolerances in tractors and motor vehicles; pocket handbook]
Zazory v traktorakh i avtomobiliakh; karmennyi spravochnik.
Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 365 p. (MIRA 14:2)

(Tractors--Maintenance and repair)
(Motor vehicles--Maintenance and repair)

BYSTRITSKIY, Dorian Naumovich; GORSHKOV, Ye.M.; ZUYEV, V.A.; SMELYANSKIY,
V.A., spets.red.; SILIN, V.S., red.; BALLOD, A.I., tekhn.red.

[Mobile electric power plants in agriculture] Peredvizhnye
elektricheskie stantsii v sel'skom khoziaistve. Moskva, Gos.
izd-vo sel'khoz.lit-ry, 1960. 251 p. (MIRA 13:5)
(Electric power plants)

SHEFTER, Yakov Iosifovich, kand.tekhn.nauk; ROZHDESTVENSKIY, I.V., kand.
tekhn.nauk; PECHKOVSKIY, G.A., inzh.; SMOLYANSKIY, V.A., red.;
SILIN, V.S., red.; PEVNER, V.I., tekhn.red.

[Assembling, maintaining, and repairing wind-driven machinery]
Montazh, ekspluatatsiya i remont vetroustanovok. Moskva, Gos.
izd-vo sel'khoz.lit-ry, 1960. 301 p. (MIRA 13:5)
(Windmills--Maintenance and repair)

KAZANSKIY, M.M.; TVERDOKHLEB, G.V.; SILIN', V.T.

Emulsification of milk fat by means of emulsifying agents. *Izv.*
vys.ucheb.zav.; pishch.tekh. no.1:64-70 '60. (MIRA 13:6)

1. Kafedra tekhnologii molika i molochnykh produktov Leningrad-
skogo instituta kholodil'noy promyshlennosti.

(Oils and fats, Edible)

(Emulsifying agents)

(Milk)

SILIN, V.V.; SUTOTSKIY, I.N.; DUBOVTSOVA, V.A.; ANTONOV, D.G., otv.red.;
PEVZNER, A.S., zaveduyushchiy redaktsiyey izd-va; OSENKO,
L.M., tekhn.red.

[Uniform time and pay standards for construction, assembly, and
repair operations in 1960] Edinye normy i rastsenki na stroi-
tel'nye, montazhnye i remontno-stroitel'nye raboty, 1960 g.
Moskva, Gos.izd-vo lit-ry po stroit., arkhitekt. i stroit.materialam.
Sbornik 30. [Assembling boiler units] Montazh kotel'nykh ustano-
vok. 1960. 121 p. (MIRA 13:6)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroi-
tel'stva. 2. Tsentral'noye normativno-issledovatel'skoye byuro
Ministerstva stroitel'stva elektrostantsiy SSSR (TsNIB MSES) for
Sutotskiy, Dubovtseva). (Wages) (Boilers)

SILIN, Ye.^A, nauchnyy sotrudnik

Wells at your house. Tekh. mol. 26 no. 7:22-23 '58. (MIRA 11:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidrotekhniki i
melioratsii imeni A.N. Kostyakova.
(Wells)

SOV/29-59-8-15/29

14(9)

AUTHOR:

Silin, Ye. A. Engineer

TITLE:

Air Lifts Water

PERIODICAL:

Tekhnika molodezhi, 1959, Nr 8, p 18 (USSR)

ABSTRACT:

In this article, the author reports on water pumps working with compressed air. The air functions as a piston. One of the most perfect pumps of this kind is the pneumatic water pump designed by Engineer V. V. Savotin (Scheme). The compressor of this pump may be driven by wind-, electric and combustion engines, or by hand. Engineer Savotin developed a wind-compressor unit "VKU-3.5". It consists of a pneumatic pump without a piston, and a two-bladed wind wheel with a diameter of 3.5 m. By means of this plant, about 50 - 70 m³ can be raised within 24 hours from dug wells, boreholes and open waters from a depth of up to 35 m. The compressed air is supplied by the automobile compressor "ZIL-150". The wind motor was developed by the Tsentral'naya nauchno-issledovatel'skaya laboratoriya vetrostilovykh ustanovok (Central Scientific Research Laboratory for Wind Power Plants) in the town of Istra of ✓

Card 1/3

SOV/29-59-8-15/29

Air Lifts Water

the Moscow oblast'. The pumping device is produced by the zavod imeni 20 let Oktyabrya Ministerstva sel'skogo khozyaystva SSSR (Works imeni 20 Years of October of the Ministry of Agriculture USSR) in Alma Ata. For private use, the pneumatic pump produced by the Nazarovskiy chugunoliteynyy zavod Ryazanskogo sovnarkhoza (Nazarovka Cast-iron Works of the Ryazan' sovnarkhoz) can be recommended. The plans for this pump were developed by the Vsesoyuznyy nauchno-issledovatel'skiy institut transportnogo stroitel'stva (All-Union Scientific Research Institute of Transport Construction Engineering) (Moskovskaya oblast', town of Babushkin, p/o 2, TsNIIS Mintransstroy). The construction of this pump is very simple, and can be carried out by any workshop. The water-pump unit consists of the following principal parts: compressor, suction chamber, hydrant pillar, water- and air pipes. A small hand-operated compressor "RK-30" produced by the Penzenskiy zavod khimicheskogo mashinostroyeniya (Penza Works of Chemical Machinery) is used. The compressor can also be driven by an electric

Card 2/3

SOV/29-59-8-15/29

Air Lifts

Water

motor. This unit raises 23 l, per minute from a depth of 16 m,
and 12 l. of water from a depth of 30 m. It must be operated
60 times for this purpose. There are 2 figures. ✓

Card 3/3

SILIN, Ye.A., inzh.

Use of slow filters in rural water supply. Trudy VNIIGM
35:66-76 '60. (MIRA 14:9)
(Filters and filtration) (Water--Purification)

SILIN, Ye.A., kand. tekhn. nauk; LOMBARDO, N.D., inzh.

Regulator of the speed of filtration for slow filters. Gidr. i mel.
17 no.2:51-56 F '65. (MIRA 18:5)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidrotekhniki i
melioratsii imeni A.N.Kostyakova.

L 34888-66 EWT(1)/T JK
ACC NR: AP6026570

SOURCE CODE: UR/0240/66/000/003/0090/0093

AUTHOR: Abramovich, G. A. (Candidate of biological sciences); Meganova, S. V. (Candidate of biological sciences); Silin, Ye. A. (Candidate of technical sciences); Lombardos, N. D. (Candidate of technical sciences)

ORG: Saratov Scientific Research Institute of Rural Hygiene (Saratovskiy nauchno-issledovatel'skiy institut sel'skoy gigiyeny); All Union Scientific Research Institute of Hydraulics Engineering and Soil Improvement im. Kostyakov, Moscow (Vsesoyuznyy nauchno-issledovatel'skiy institut gidrotekhniki i melioratsii)

TITLE: Hygienic evaluation of an installation for purifying and decontaminating water without the use of reagents

SOURCE: Gigiyena i sanitariya, no. 3, 1966, 90-93

TOPIC TAGS: water purification equipment, water purification

ABSTRACT: The authors designed and successfully tested an apparatus for purifying water that does not use chemical reagents. Intended for farming areas, the apparatus consists of a slow filter with a sedimentation area that permits the filter to handle water with up to 500 mg/l of suspended matter, an electric coagulator, and a bubbling-type aerator. If the coagulator is placed before the sedimentation area of the slow filter, water with more than 500 mg/l of suspended matter and a color index of more than 500 can be treated. Reagent-free coagulation consists essentially of anode dissolving of aluminum (or iron) in a flow-type electrolyzer through which the water to be treated flows. The bubbling-type aerator removes odors and aftertastes chiefly of biological origin. It also helps to eliminate some types of impurities such as iron. A bactericidal unit decontaminates the water. Orig. art. has: 2 figures and 1 table.

SUB CODE: 13 / SUBM DATE: 12Oct65

UDC: 614.777.1:628.16

Card 1/1

09/6 2263

IZRAYELIT, B.Z.; SUVOROV, N.A.; VINNIK, I.V.; SILIN, Ye.M.

Anchor bolting at the Mine No.3 of the Yama Dolomite Combine.
Nauch. trudy KHGI no.6:143-154 '58. (MIRA 14:4)
(Yama region--Mine roof bolting)

SIRCHENKO, I.P., inzh.; SILIN, Ye.M.; LOBUNETS, V.I.

Making an intermediate entry at a speed of 250 m. per month. Shakht.stroi. 4 no.7:28-29 J1 '60.
(MIRA 13:7)

1. Shakhta "Krasnopol'skaya-Glubokaya" (for Sirchenko).
2. Ukrainskiy nauchno-issledovatel'skiy institut organizatsii i mekhanizatsii shakhtnogo stroitel'stva (for Silin).
3. Khar'kovskiy gornyy institut (for Lobunets).
(Mining engineering)

DEICH, S.; PASTEL'S, P.; KRYLOV, A.; SILIN, Yu.; RAVICH, M.

Comparative data on the absolute age of rocks in the Queen Maud
Land (Antarctic). Dokl. AN SSSR 156 no. 3:554-557 '64.
(MIRA 17:5)

1. Nauchno-issledovatel'skiy institut geologii Arktiki i Bryussel'-
skiy universitet, Bryussel', Bel'giya. Predstavleno akademikom
D.I.Shcherbakovym.

L 5442-66 EWT(1)/EPA(a)/EWT(n)/EPF(n)-2/EWP(t)/ENP(b) IJP(c) JD/WJ/JG
 ACCESSION NR: AP5017914 44.55 UR/0051/65/019/001/0154/0156
 535.372 :535.2

AUTHOR: Karulinya, E. K.; Lezdin', A. E.; Silin', Yu. A. 44.55 56
 TITLE: Absolute intensities of thallium spectral lines in sensitized fluorescence
 of mercury and thallium vapors 44.55 8

SOURCE: Optika i spektroskopiya, v. 19, no. 1, 1965, 154-156

TOPIC TAGS: mercury, thallium, spectral line, line intensity, fluorescence spectrum

ABSTRACT: Mercury atoms were optically excited to the 6^3P_1 level, imparting their energy by collision to neutral thallium atoms. The optical pumping was produced by a tube in the form of a quartz sphere (30--40 mm dia.) with two extensions, one containing mercury and the other thallium. Each extension was kept at a different temperature. Intensities were recorded photoelectrically. As a result, 11 thallium lines were observed in the fluorescence spectrum. The energy levels of the mercury and thallium are shown in Fig. 1 of the enclosure. The absolute intensities of the spectral lines were obtained by comparison with the continuous spectrum of a ribbon-filament or hydrogen lamp. The intensities and the level populations calculated from them are tabulated. "The authors thank S. E. Frish for interest and V. Mashnikova and V. Freyde for help with the measurements." 44.55
 44.55 and 2 tables. 44.55 Orig. art. has: 2 figures

Card 1/3

07010256

L 5442-66
ACCESSION NR: AP5017914

ASSOCIATION: none

SUBMITTED: 18Feb65

NR REF SOV: 003

ENCL: 01

OTHER: 003

SUB CODE: OP

Card 2/3

L 5442-66
ACCESSION NR: AP5017914

ENCLOSURE: 01

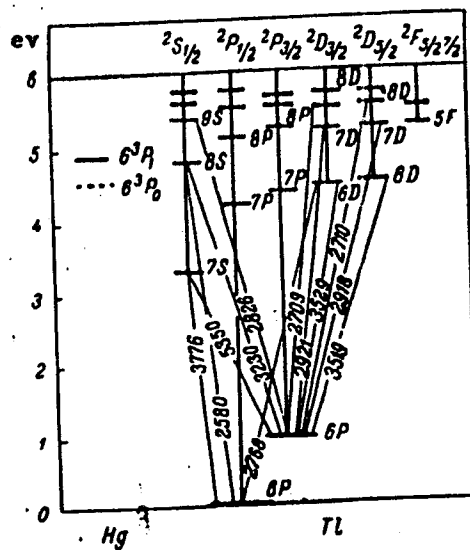


Fig. 1. Energy levels of mercury and thallium

Card 3/3 *ML*

SILIN YU. I.

Silin, Yu. I. - The Determination of Age by Means of the Argon Method by Sedimentary Rocks.

The Sixth Session of the Committee for Determining the Absolute Age of Geologic Formations at the Department of Geologic-Geographical Sciences (OGGN) of the USSR Academy of Sciences at Sverdlovsk in May 1957

Izv. Ak Nauk SSSR, Ser. Geol., No. 1, 1958, p. 115-117 author Pekarskaya, T. B.

SOV 20-127-5-59 20

Author: Artyukov, V. I., ibid., No. 1.

Title: The Age of the Metamorphism of the Ancient Sediments of the Northern Zone of Tyan'- Shan' (Vremya metamorfizma drevnikh otlozheniy severnoy zony Tyan'- Shan'ya)

Reference: Doklady Akademii Nauk USSR, 1958, Vol. 122, No. 5, pp 889-891 (USSR)

Abstract: If the age of a rock is determined by means of the Argon Method, the age of the crystallization of potassium minerals is established. The same holds true for determining the age of new potassium minerals, primarily feldspar and mica, in a metamorphic rock. If the metamorphism was complete and encompassed a large region, it must be possible to determine the age of the metamorphism of the rock (its "metamorphic level") by the Argon Method. V. I. Vernadskiy has proclaimed that the determination of the "metamorphic level" in the oldest cross-section of the earth's crust is of great significance (Refs 1,2). One of the most interesting regions for determination of metamorphic time relations is Srednyaya Aziya (Middle Asia) (Ref 3). In this area a series of superimposed tectonic structures have

Card 1

NOV. 20-122-5-32/56

The Age of the Metamorphism of the Ancient Sediments of the Northern Zone of
Tyan'-Shan'

been produced. The authors have studied a wealth of material from the metamorphic rocks of Northern Tyan'-Shan' in order to determine ages. In this area there are 3 clearly defined intrusive cycles with the ages of 400, 440, and 260 million years, respectively (Zak.). Through study of age determinations of the metamorphic rocks, the authors arrive at the following conclusions: 1) The ages of an overwhelming majority of rocks in the Northern Tyan'-Shan' correspond approximately to the ages of the Caledonian granitoid rocks: 400-440 million years. 2) The late-metamorphic (possibly Variscan) rocks were metamorphosed to granulites of the uniform composition during Caledonian times. At the same time most of the Lower Paleozoic rocks were made into schists and hornstones (rarely gneiss). 3) The granitoids of the first intrusive cycle (500 million years in age) were not significantly metamorphosed during later cycles. 4) The Hercynian and Alpine orogenies have produced no discernible metamorphism in this region. 5) However, two age determinations from the southern zone (Pamir, sent by D. I. Zhelezovsky) were of Alpine age. This zone requires special

Card 211

007/20-122-5-39/56

Study of the Metamorphism of the Ancient Sediments of the Northern Zone of
Leningrad

study. 6) The Argon Method gives rather consistent results and may be used to determine "metamorphic levels" in time. The paper was carried out at the laboratory by I. Ye. Starik, who also took part in this work. There are 1 table and 3 Soviet references.

ASSOCIATION: Radiogeology Institute im. V. G. Khlopina Akademii nauk SSSR
(Radiogeology Institute im. V. G. Khlopina of the Academy of
Sciences USSR)

PREPARED: May 24, 1978, by D. I. Shcherbakov, Academician

SUBMITTED: May 1, 1978

Card 1 of 1

3(0)
AUTHORS: Krylov, A. Ya., Silin, Yu. I.,
Lovtsyus, A. V. SOV/20-124-3-47/67

TITLE: The Age of the Granitoids in the Northern Zone of Tyan'-Shan'
(Vozrast granitoidov severnoy zony Tyan'-Shanya)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 3, pp 658-660
(USSR)

ABSTRACT: Previously published argon method determinations of the age of the granitoids in the Northern Zone of Tyan'-Shan' (Refs 2-5) are primarily concerned with the Terskey-Alatau mountain range. Some of these ages were not well enough established because the isotopic composition of the argon was not determined. Today the authors have more data for analysis, which as before concerns the rocks themselves, not nonmineralic fractions. The work was carried out in the laboratory of I. Ye. Starik. A few researchers consider that mica alone is suitable for use in age determinations, for feldspar and granitoids give much too young an age. Although in the granitoids feldspar often surpasses mica in abundance - for example mica is often lacking entirely - hundreds of age determinations have been already made directly from granites

Card 1/3

The Age of the Granitoids in the Northern Zone of
Tyan'-Shan'

SOV/20-124-3-47/67

of the same mountain massifs. The results are as a rule rather close for granites of the same mountain massifs and for granites of the same age from different massifs; the ages are constant and compare well with one another. Table 1 shows ages of rocks determined by the argon method. In northern and central Tyan'-Shan' predominantly Caledonian granitoids (approximately 90 %) occur. Second in abundance are gray, often porphyritic granites and granitoids of Phase 1. The ages of granites of Phase 2 (red alaskite-granites) often lead to a misunderstanding in the age determination. Hercynian granitoids are represented by alaskite-granite, granosyenite, and syenite. Although the specimens analyzed by the authors are not, compared to other work, sufficiently evaluated, they characterize to some extent the main scheme. Above all, the rather close coincidence of ages for the granitoids of each cycle should be stressed. As seen in table 1, the extreme variations of average ages are at most $\pm 10\%$. Most do not exceed this variation by $\pm 3-5\%$. Thus, three intrusive cycles of the northern Tyan'-Shan' Zone can be defined with complete confidence. The granitoids of the same

Card 2/3

The Age of the Granitoids in the Northern Zone of
Tyan'-Shan'

SOV/20-124-3-47/67

age can be closely enough paralleled with each other in different structural zones. Granites of Cycle 1 ("Proterozoic" or "Salairskiye") were not well enough determined. Data is lacking and also the rocks are somewhat altered. Hence, the age determined is perhaps too young. The ages of granites of the Caledonian cycle - approximately 340 million years - agree well with many age determinations of metamorphic rocks of the same area. There are 1 table and 5 Soviet references.

PRESENTED: August 25, 1958, by D. I. Shcherbakov, Academician

SUBMITTED: July 30, 1958

Card 3/3